

# SPECIES OF CEROPLASTINAE (HOMOPTERA : COCCIDAE) FROM INDIA<sup>1</sup>

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AND

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(With four text-figures)

Brief review of the subfamily Ceroplastinae is given. Key to Indian genera of Ceroplastinae, and separate keys to Indian species of the genera *Ceroplastes* Gray and *Cerostegia* De Lotto are provided. Descriptions and illustrations of three species of *Ceroplastes* Gray [*C. alami* sp. nov., *C. ceriferus* (Fabricius), *C. pseudoceriferus* Green] and one species of *Vinsonia* Signoret [*V. stellifera* (Westwood)] are given. Material deposited in Zoological Museum, Aligarh Muslim University, Aligarh, India.

## Subfamily CEROPLASTINAE Signoret

Ceroplastaria Signoret, 1872b: 423.

Ceroplastinae Signoret; Bodenheimer, 1952: 317.

Ceroplastiinae Signoret; Bodenheimer, 1953: 93.

Signoret (1872b) proposed Ceroplastaria as subsection under the section Lecanites. Atkinson (1886) recognized Ceroplastaria as subdivision under the subfamily Lecanina. Bodenheimer (1952) raised Ceroplastaria to the rank of subfamily Ceroplastinae in the family Coccidae. The subfamily status of Ceroplastinae has been accepted by Borchsenius (1957) and Ali (1971). Giliomee (1967) has shown the affinity of *Ceroplastes* Gray with *Coccus* Linnaeus on the basis of the study of adult males. Further, he suggested the synonymy of the subfamily name Ceroplastinae with Coccinae of the family Coccidae. Williams (1969) credited the authorship of this group name to Maskell instead of Signoret. Recently, Koteja

(1974) suppressed the subfamily Ceroplastinae and assigned its genus *Ceroplastes* under Coccini Fallen. In the present study Ceroplastinae is recognized as subfamily in the family Coccidae and it is credited to Signoret. The subfamily is represented by four genera from India which are separated by the following key characters:

## KEY TO INDIAN GENERA OF CEROPLASTINAE SIGNORET, BASED ON ADULT FEMALES

1. Stigmatic spines extending along the margin of the stigmatic clefts ..... 2
- Stigmatic spines never extending along the margin of the stigmatic clefts ..... 3
2. Ventral tubular ducts, when present, with inner ductule rather long and more slender than outer one (figs. 1-3; De Lotto, 1965: figs. 2-4; 1971: figs. 1-2 & 5; Williams & Kosztarab, 1972: pls. 4 & 6 ..... *Ceroplastes* Gray, 1828
- Ventral tubular ducts with inner ductule short and as wide or wider than the outer one (De Lotto, 1969: figs. 1-3; Ben-Dov, 1970: fig. 1; Williams & Kosztarab, 1972: pl. 5; Avasthi & Shafee, 1979: fig. H & I) .....  
..... *Cerostegia* De Lotto, 1969

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3. Stigmatic spines numerous, arranged in a group and extending on dorsum at right angles to the margin; tibia and tarsus separate (De Lotto, 1965: figs. 6-12); waxy covering of body never star-shaped . . . . .  
 . . . . . *Gascardia* Targioni-Tozzetti, 1893  
 — Stigmatic spines few, confined to the cleft; tibia and tarsus fused together (fig. 4; De Lotto, 1965: fig. 23); waxy covering of body star-shaped . . . . .  
 . . . . . *Vinsonia* Signoret, 1872a.
- Legs with tibio-tarsal articulatory sclerosis; claws with denticle; dorsal setae small and never cylindrical; anal plate each with long and slender setae dorsally (fig. 1) . . . . . *C. alami* sp. nov.
3. Multilocular pores present near fore coxae; marginal setae arranged close to each other; anal lobe each with 9 long setae (fig. 3) . . . . .  
 . . . . . *C. pseudoceriferus* Green
- Multilocular pores absent near fore coxae; marginal setae widely spaced; anal lobe each with 5 long setae (fig. 2; De Lotto, 1971: figs. 1 & 2; Williams & Kosztarab, 1972: pl. 4) . . . . .  
 . . . . . *C. ceriferus* (Fabricius)

\* *Ceroplastes actiniformis* Green is not incorporated in the key due to its inadequate original description.

1. Genus *Ceroplastes* Gray

*Ceroplastes* Gray, 1828: 7.

Type-species: *Coccus* (*Ceroplastes*) *janeirensis* Gray, 1828 (by subsequent designation).

Gray (1828) proposed *Ceroplastes* as subgenus of *Coccus* Linnaeus for the species: *Coccus* (*Ceroplastes*) *janeirensis* and *C. (C.) chilensis*. Later, the subgenus was raised to the generic rank by Vigor (1829). De Lotto (1965, 1971) recognized the genera, *Columnnea* Targioni-Tozzetti, *Lacca* Signoret and *Baccacoccus* Brain as subjective synonyms of *Ceroplastes* Gray. Ali (1971) catalogued five species of *Ceroplastes* from India, of which *Ceroplastes floridensis* (Comstock) was earlier shifted by De Lotto (1969) under his genus *Cerostegia*. At present the genus is represented by five species including one new species from India. A key for the separation of Indian species of *Ceroplastes* is given below.

KEY TO INDIAN SPECIES OF *Ceroplastes* GRAY,  
 BASED ON ADULT FEMALES\*

1. Legs well developed with tibia and tarsus separate . . . . . 2  
 — Legs very small with tibia and tarsus fused together; stigmatic spines hemispherical (Zimmerman, 1948: fig. 174) . . . . . *C. rubens* Maskell
2. Legs without tibio-tarsal articulatory sclerosis; claws without denticle; dorsal setae long and cylindrical . . . . . 3

***Ceroplastes alami* sp. nov.**  
 (Fig. 1 A-N)

*Adult female* (fig. A): Mounted specimens broadly oval in shape, less than one and a half times longer than wide (2.52:1.76 mm). Dorsum with membranous processes which are devoid of pores and setae; dorsal setae (fig. C) small and thick with bluntly pointed and truncated apices, sparsely distributed; bi- and trilocular pores (fig. D) present. Marginal setae (fig. B) simple and curved, few straight, widely spaced, 3 long simple setae present on each anal lobe. Stigmatic clefts shallow, each with 22-27 small, thick and conical spines (fig. G), arranged in a linear row along the margin of the stigmatic clefts, single large conical spine present on mid of each cleft. Caudal process strongly sclerotized. Anal plates (fig. E) together slightly longer than wide placed at the apex of caudal process, anterolateral margins much shorter than posterolateral margins; each plate with 1 apical, 1 subdiscal and 1 discal long and slender setae dorsally, 2 long subapical setae ventrally; anal fold with 4 pairs of small fringe setae.

Venter with few small and thin setae (fig. M)

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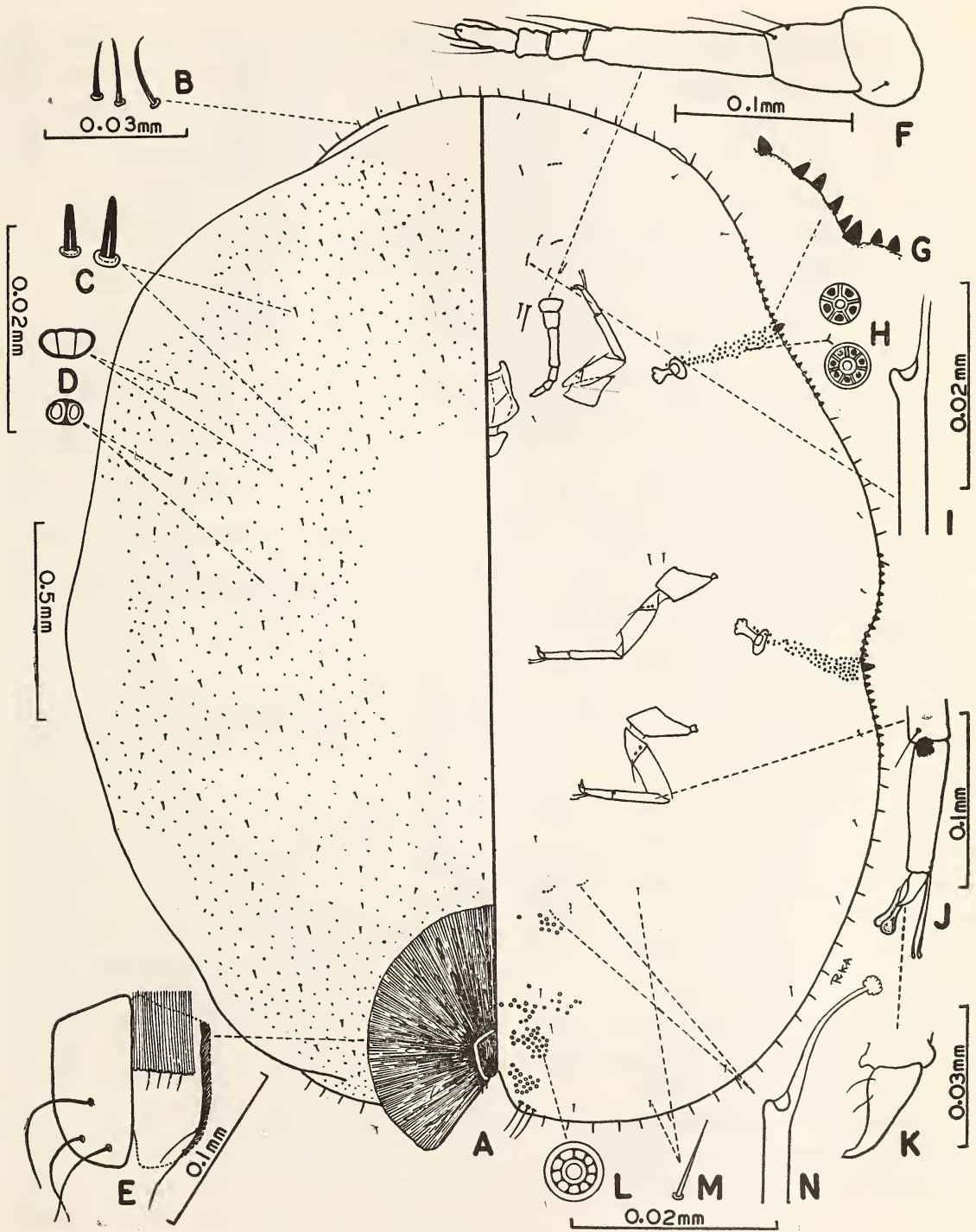


Fig. 1. A-N. *Ceroplastes alami* sp. nov., ♀.

on submarginal and median areas; 2 pairs of interantennal setae of variable lengths present, prevulvar setae absent. Pores with 5-7 locules (fig. H) arranged in a band between spiracles and stigmatic clefts. Multilocular pores (fig. L) in groups around genital opening and near anal lobes. Tubular ducts (figs. I, N) with inner ductule more slender than outer one, confined to cephalic and abdominal regions medially. Eyes present. Antennae (fig. F) 6-segmented, 0.26 mm in length; segment 3rd longest, about 5 times longer than wide. Rostrum monomerous. Spiracles small. Legs well developed with tibio-tarsal articulatory sclerosis (fig. J); claws with a small denticle at apices (fig. K), digitules longer than claw and clubbed at apices; tarsal digitules slender, clubbed at apices; dimensions of fore, mid and hind legs: trochanter + femur (0.15: 0.17: 0.18 mm), tibia (0.12: 0.12: 0.12 mm) and tarsus (0.07: 0.07: 0.07 mm) respectively.

*Holotype* ♀. INDIA: Tamil Nadu, Coimbatore, Mettupalaiyam, on wild plant, 26.iii.1979 (R. K. Avasthi).

*Paratypes*. 3 ♀, same data as holotype. 6 ♀, Uttar Pradesh, Aligarh, on *Dalbergia sissoo*, 7.vii.1979 (R. K. Avasthi).

The new species is closely related to *Ceroplastes toddaliae* Hall and *C. spicatus* Hall. It differs from the former by its having interrupted row of stigmatic spines between anterior and posterior stigmatic clefts; and from the latter by its having reduced number of stigmatic spines, small caudal process, and in the absence of stout spike on wax test.

This species is named after Prof. S. Mashhood Alam, Department of Zoology, Aligarh Muslim University, Aligarh, India.

#### **Ceroplastes actiniformis** Green

*Ceroplastes actiniformis* Green, 1896: 8.

*Ceroplastes actiniformis* Green; Green, 1930: 281.

*Ceroplastes actiniformis* Green; Ali, 1971: 15.

This species is known to the authors only by its original description.

#### **Ceroplastes ceriferus** (Fabricius)

(Fig. 2 A-M)

*Coccus ceriferus* Fabricius, 1798: 546.

*Coccus chilensis* Gray, 1828: 7.

*Ceroplastes ceriferus* (Fabricius); Walker, 1852: 1087.

*Ceroplastes australiae* Walker, 1852: 1087.

*Columnnea cerifera* (Fabricius); Targioni-Tozzetti, 1866: 144.

*Ceroplastes ceriferus* (Anderson); Signoret, 1868: 848.

*Lacca alba* Signoret, 1868: 848.

*Ceroplastes ceriferus* (Anderson); Atkinson, 1886: 280.

*Ceroplastes ceriferus* (Anderson); Fernald, 1903: 149.

*Ceroplastes ceriferus* (Anderson); Morrison, 1920: 200.

*Ceroplastes ceriferus* (Anderson); Ayyar, 1930: 39.

*Ceroplastes ceriferus* (Anderson); Borchsenius, 1957: 457.

*Ceroplastes ceriferus* (Anderson); Das & Ganguli, 1961: 250.

*Gascardia cerifera* (Anderson); De Lotto, 1965: 198.

*Ceroplastes ceriferus* (Anderson); Ali, 1971: 16.

*Ceroplastes ceriferus* (Fabricius); De Lotto, 1971: 133.

*Ceroplastes ceriferus* (Fabricius); Williams & Kosztarab, 1972: 36.

*Adult female* (fig. A): Mounted specimens broadly oval in shape, less than one and a half times longer than wide (2.97: 2.21 mm). Dorsum with membranous processes which are devoid of pores and setae; dorsal setae (fig. B) long, thick and cylindrical, most with blunt and few with swollen apices, sparsely distributed; bi-, tri- and quadrilocular pores (fig. C) present. Marginal setae simple and curved, widely spaced, 5 long simple setae present on each anal lobe. Stigmatic clefts much shallow, each with numerous small, thick and conical spines (figs. D, E) and few extending along the margin of the cleft. Caudal process strongly



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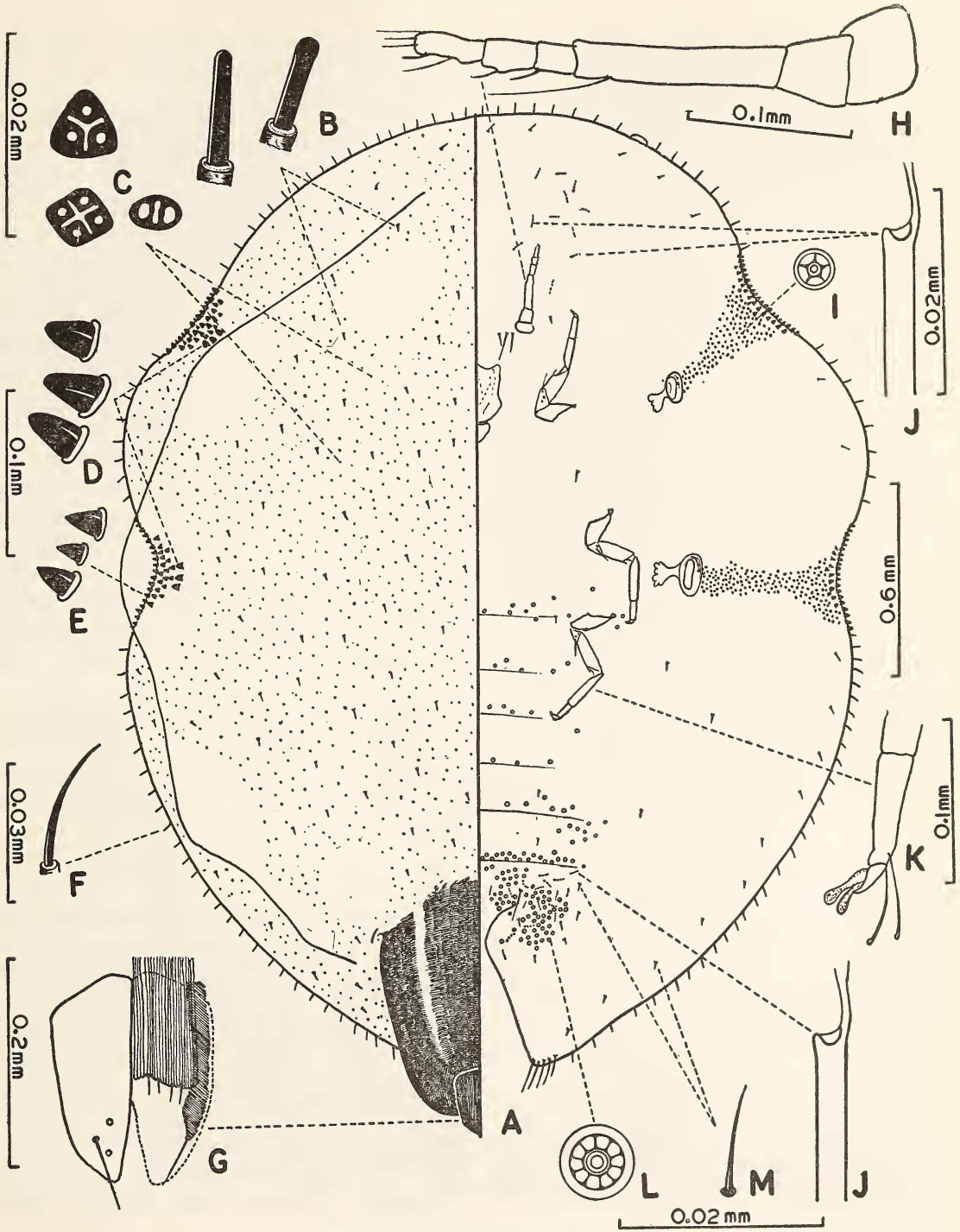


Fig. 2. A-M. *Ceroplastes ceriferus* (Fabricius), ♀.

sclerotized. Anal plates (fig. G) together longer than wide, placed at the apex of caudal process, anterolateral margins much shorter than posterolateral margins; each plate with 3 apical setae dorsally, 1 long subapical seta ventrally; anal fold with 4 pairs of small fringe setae.

Venter with thin setae (fig. M) arranged in a row submarginally, few scattered irregularly; 3 pairs of interantennal setae of variable lengths and a pair of long prevulvar setae present. Quinquelocular pores (fig. I) in a broad band between spiracles and stigmatic clefts. Multilocular pores (fig. L) numerous around genital opening and few extend medially upto posterior spiracles. Tubular ducts (fig. J) few with inner ductule more slender than outer one, confined to cephalic and genital regions. Eyes present. Antennae (fig. H) 6-segmented, 0.28 mm in length; segment 3rd longest, more than 5 times longer than wide. Rostrum monomeric. Spiracles large. Legs well developed, without tibio-tarsal articulatory sclerosis; claws simple, digitules longer than claw and clubbed at apices; tarsal digitules slender and clubbed at apices (fig. K); dimensions of fore, mid and hind legs: trochanter + femur (0.14: 0.15 : 0.16 mm), tibia (0.1 : 0.1 : 0.1 mm) and tarsus (0.05 : 0.06 : 0.07 mm) respectively.

*Material examined:* 4 ♀, INDIA: Tamil Nadu, Coimbatore, Forest Research Center Garden, on wild plant, 27.iii.1979; 3 ♀, Vadamadurai, on *Abutilon indicum*, 29.iii.1979 (R. K. Avasthi).

*Note:* The authorship of the species has been discussed in detail by De Lotto (1971).

***Ceroplastes pseudoceriferus* Green**  
(Fig. 3 A-N)

*Ceroplastes pseudoceriferus* Green, 1935: 180.

*Ceroplastes pseudoceriferus* Green; Green, 1937: 310.

*Ceroplastes pseudoceriferus* Green; Sankaran, 1962: 1-18.

*Ceroplastes pseudoceriferus* Green; Ali, 1971: 18.

*Ceroplastes pseudoceriferus* Green; De Lotto, 1971: 142.

*Adult female* (fig. A): Mounted specimens broadly oval in shape, less than one and a half times longer than wide (3.57:2.7 mm). Dorsum with membranous processes which are devoid of pores and setae; dorsal setae (fig. E) small, thick and cylindrical with slightly swollen apices, sparsely distributed; bi- and trilocular pores (fig. D) present. Marginal setae (fig. B) simple and curved, few straight, arranged very close to each other, 9 long simple setae present on each anal lobe. Stigmatic clefts much shallow each with numerous small, thick and conical spines, few extending along the margin of the cleft. Caudal process strongly sclerotized. Anal plates (fig. F) together longer than wide placed at the apex of caudal process, anterolateral margins much shorter than posterolateral margins; each plate with 2 apical and 1 discal setae dorsally, 1 small subapical seta ventrally; anal fold with 3 pairs of small fringe setae.

Venter with small thin setae (fig. N) arranged in a row submarginally and few scattered medially; 3 pairs of interantennal setae of variable lengths and a pair of long prevulvar setae present. Quinquelocular pores (fig. I) in a broad band between spiracles and stigmatic clefts. Multilocular pores (fig. M) numerous around genital opening and in transverse rows on preceding abdominal segments, few near each coxae. Tubular ducts (fig. J) few with inner ductule more slender than outer one, confined to cephalic region and around genital opening. Eyes present. Antennae (fig. G) 6-segmented, 0.32 mm in length; segment 3rd longest, less than 6 times longer than wide. Rostrum (fig. H) monomeric. Spiracles normal. Legs well developed, without tibio-tarsal articulatory sclerosis; claws simple, digitules

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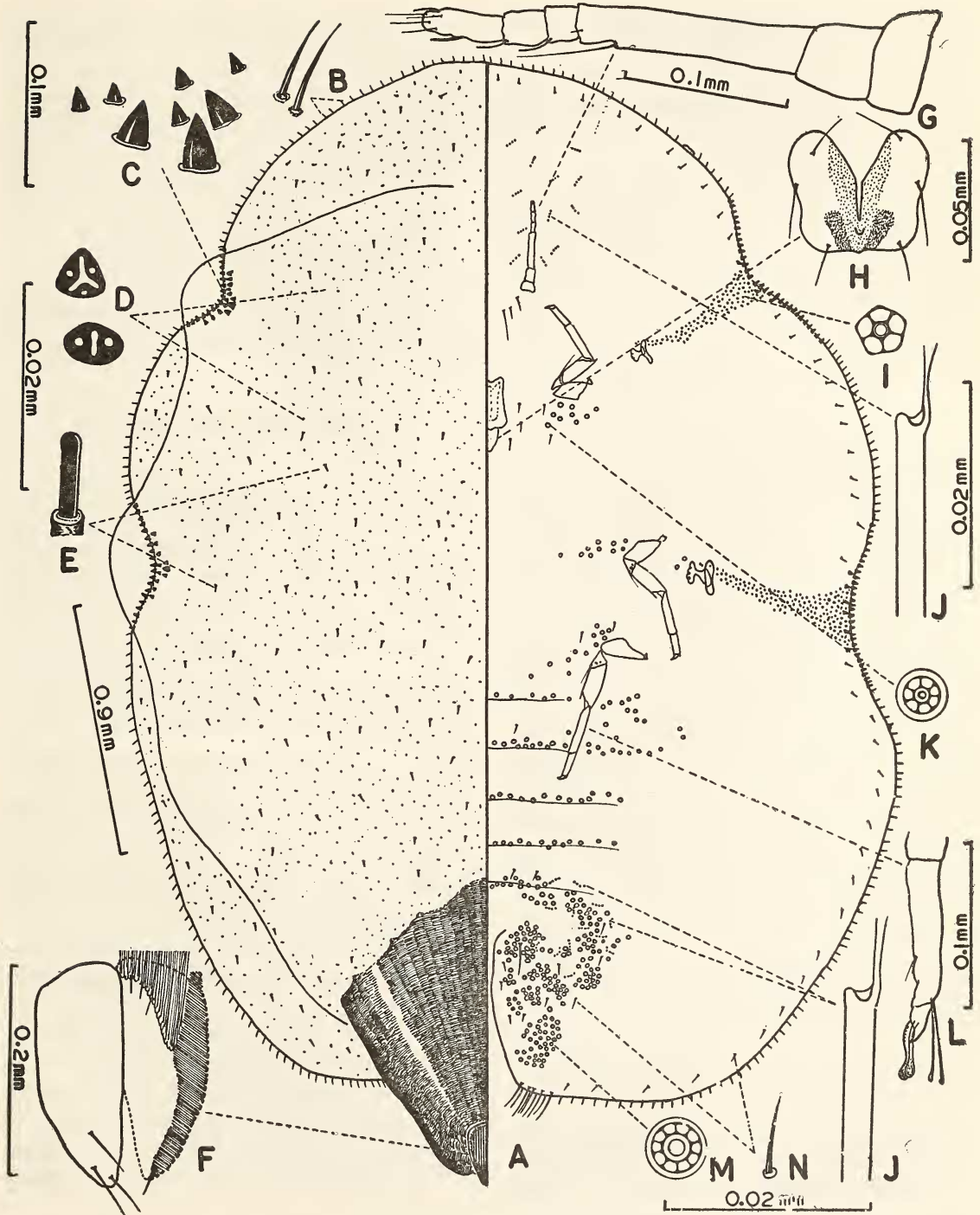


Fig. 3. A-N. *Ceroplastes pseudoceriferus* Green, ♀.



longer than claw and clubbed at apices; tarsal digitules slender and clubbed at apices (fig. L); dimensions of fore, mid and hind legs: trochanter + femur (0.18:0.18:0.19 mm), tibia (0.13:0.14:0.15 mm) and tarsus (0.07:0.08:0.08 mm) respectively.

*Material examined*: 6 ♀, INDIA: Uttar Pradesh, Aligarh, Somna, Govt. Krishi Farm, on *Mangifera indica* Linn., and *Blumea lacera*; 2.v.1977; 3 ♀, Bulandshahar, Danwar, on *Mangifera indica* Linn., 12.v.1977 (R. K. Avasthi).

### *Ceroplastes rubens* Maskell

*Ceroplastes rubens* Maskell, 1893: 214.  
*Ceroplastes rubens* Maskell; Ayyar, 1930: 40.  
*Ceroplastes rubens* Maskell; Zimmerman, 1948: 343.  
*Ceroplastes rubens* Maskell; Das & Ganguli, 1961: 250.  
*Ceroplastes rubens* Maskell; De Lotto, 1965: 187.

The species has been fully redescribed and illustrated by Zimmerman (1948).

#### 2. Genus *Cerostegia* De Lotto

*Cerostegia* De Lotto, 1969: 211.  
 Type-species: *Ceroplastes rufus* De Lotto, 1966 (by original designation).

De Lotto (1969) proposed the genus *Cerostegia* for 3 species of the genus *Ceroplastes* Gray (*C. floridensis* Comstock, *C. japonicus* Green and *C. rufus* De Lotto) and designated *C. rufus* De Lotto as its type-species. Very recently, Avasthi & Shafee (1979) described the species *Cerostegia ajmerensis* from India. At present this genus includes 4 species, of which 2 species are known to occur in India. The Indian species are separated by the following key characters.

#### KEY TO INDIAN SPECIES OF *Cerostegia* DE LOTTO, BASED ON ADULT FEMALES

1. Caudal process reaching just beyond the abdominal apex; anal cleft small, less than twice the length of anal plates; quadrilocular pores present

on dorsum; tubular ducts with inner ductule short, one-third the length of outer ductule (De Lotto, 1969: fig. 1) . . . *C. floridensis* (Comstock)  
 — Caudal process slightly away from the abdominal apex; anal cleft well developed, more than twice the length of anal plates; quadrilocular pores absent on dorsum; tubular ducts with inner ductule long, slightly shorter than outer ductule (Avasthi & Shafee, 1979: figs. H & I) . . . . . *C. ajmerensis* Avasthi & Shafee

### *Cerostegia ajmerensis* Avasthi & Shafee

*Cerostegia ajmerensis* Avasthi & Shafee, 1979: 36.  
*Material examined*: 7 ♀, INDIA: Rajasthan, Ajmer, Hathi Bhata, on *Cassia fistula*, 3.ii.1978 (R. K. Avasthi).

### *Cerostegia floridensis* (Comstock)

*Ceroplastes floridensis* Comstock, 1881: 331.  
*Ceroplastes floridensis* Comstock; Green, 1896: 8.  
*Ceroplastes floridensis* Comstock; Fernald, 1903: 152.  
*Ceroplastes floridensis* Comstock; Green, 1908: 43.  
*Ceroplastes floridensis* Comstock; Ayyar, 1930: 40.  
*Ceroplastes floridensis* Comstock; Borchsenius, 1957: 459.  
*Cerostegia floridensis* (Comstock); De Lotto, 1969: 211.  
*Ceroplastes floridensis* Comstock; Ali, 1971: 16.  
*Cerostegia floridensis* (Comstock); Ben-Dov, 1971: 25.  
*Ceroplastes floridensis* Comstock; Williams & Kosztarab, 1972: 43.  
*Cerostegia floridensis* (Comstock); Avasthi & Shafee, 1979: 36.

*Material examined*: 3 ♀, INDIA: Uttar Pradesh, Aligarh, on *Mangifera indica* Linn., 15.viii.1979 (R. K. Avasthi).

#### 3. Genus *Gascardia* Targioni-Tozzetti

*Gascardia* Targioni-Tozzetti, in Gascard, 1893: 88.

Type-species: *Gascardia madagascariensis* Targioni-Tozzetti, 1893 (by monotypy).

Targioni-Tozzetti in Gascard (1893) proposed the genus *Gascardia* and placed it close to lac insects. Newstead (1908) and Mamet (1951) independently have shown its affinity



with *Ceroplastes* Gray. De Lotto (1965) re-defined the genus *Gascardia* and assigned under it the wax scales having the stigmatic spines set in more or less compact groups which extend from the stigmatic clefts towards the dorsum. The genus is represented by a single species from India.

#### *Gascardia destructor* (Newstead)

- Ceroplastes destructor* Newstead, 1917: 26.  
*Ceroplastes destructor* Newstead; Brain, 1920: 28.  
*Gascardia destructor* (Newstead); De Lotto, 1965: 200.  
*Ceroplastes destructor* Newstead; Subba Rao, 1965: 71-75.  
*Gascardia destructor* (Newstead); Hodgson, 1969: 24.

The species has been redescribed in detail by De Lotto (1965). Subba Rao (1965) reported this species from India as host of an encyrtid parasite *Anicetus parvus* Compere.

#### 4. Genus *Vinsonia* Signoret

*Vinsonia* Signoret, 1872a: 33.  
 Type-species: (*Vinsonia pulchella* Signoret, 1872) = *Coccus stellifer* Westwood, 1871 (by monotypy).  
 Signoret (1872a) proposed the genus *Vinsonia* for the species, *Vinsonia pulchella* Signoret. The same author (1877) synonymized his species *V. pulchella* with *Coccus stellifer* Westwood which is generally accepted as type-species of *Vinsonia* Signoret. Lindinger (1913) synonymized *Vinsonia* Signoret with *Ceroplastes* Gray, whereas, Takahashi (1939) suggested its synonymy with *Ceroplastes*. Morrison (1920), Ayyar (1930), Green (1930, 1937), Ghose (1961), De Lotto (1965) and Ali (1971) recognized it as valid genus. The genus is known to contain 2 species, of which *V. stellifera* (Westwood) is known to occur in India.

#### *Vinsonia stellifera* (Westwood) (Fig. 4 A-K)

- Coccus stellifer* Westwood, 1871: 3.  
*Vinsonia pulchella* Signoret, 1872a: 34.  
*Coccus stellifera* Westwood; Signoret, 1877: 608.  
*Vinsonia pulchella* Signoret; Atkinson, 1886: 279.  
*Vinsonia stellifera* (Westwood); Douglas, 1888: 152.  
*Vinsonia stellifera* (Westwood); Green, 1896: 8.  
*Vinsonia stellifera* (Westwood); Fernald, 1903: 159.  
*Ceroplastes stellifer* (Westwood); Lindinger, 1913: 81.  
*Vinsonia stellifera* (Westwood); Morrison, 1920: 187.  
*Vinsonia stellifera* (Westwood); Ayyar, 1930: 40.  
*Vinsonia stellifera* (Westwood); Green, 1937: 311.  
*Vinsonia stellifera* (Westwood); Ghose, 1961: 67.  
*Vinsonia stellifera* (Westwood); De Lotto, 1965: 234.  
*Vinsonia stellifera* (Westwood); Ali, 1971: 19.

*Adult female* (fig. A): Mounted specimens broadly oval in shape, slightly longer than wide (1.91 : 1.63 mm); dorsum with poorly developed membranous processes; dorsal setae absent. Bilocular pores (fig. C) with loculi of different diameter sparsely distributed except membranous processes. Marginal setae (fig. E) small, simple and curved, 2 long simple setae present on each anal lobe. Stigmatic clefts well developed, each with a group of 8-10 thick conical spines of variable lengths (figs. B, H). Anal plates (fig. D) together longer than wide, placed at the apex of a slightly elevated and sclerotized caudal process; each plate with 1 apical, 1 subdiscal and 1 discal long setae dorsally, 1 subapical seta ventrally; anal fold with 3 pairs of fringe setae of variable lengths.

Venter with few spinose setae scattered irregularly; 16-18 long and thin interantennal and a pair of long prevulvar setae present. Quinquelocular pores (fig. G) in a band between spiracles and stigmatic clefts. Multilocular pores (fig. I) few around genital opening and on anal lobes. Minute tubular ducts (fig. J) scattered irregularly. Eyes absent. Antennae (fig. F) short, 6-segmented, 0.15 mm in length;

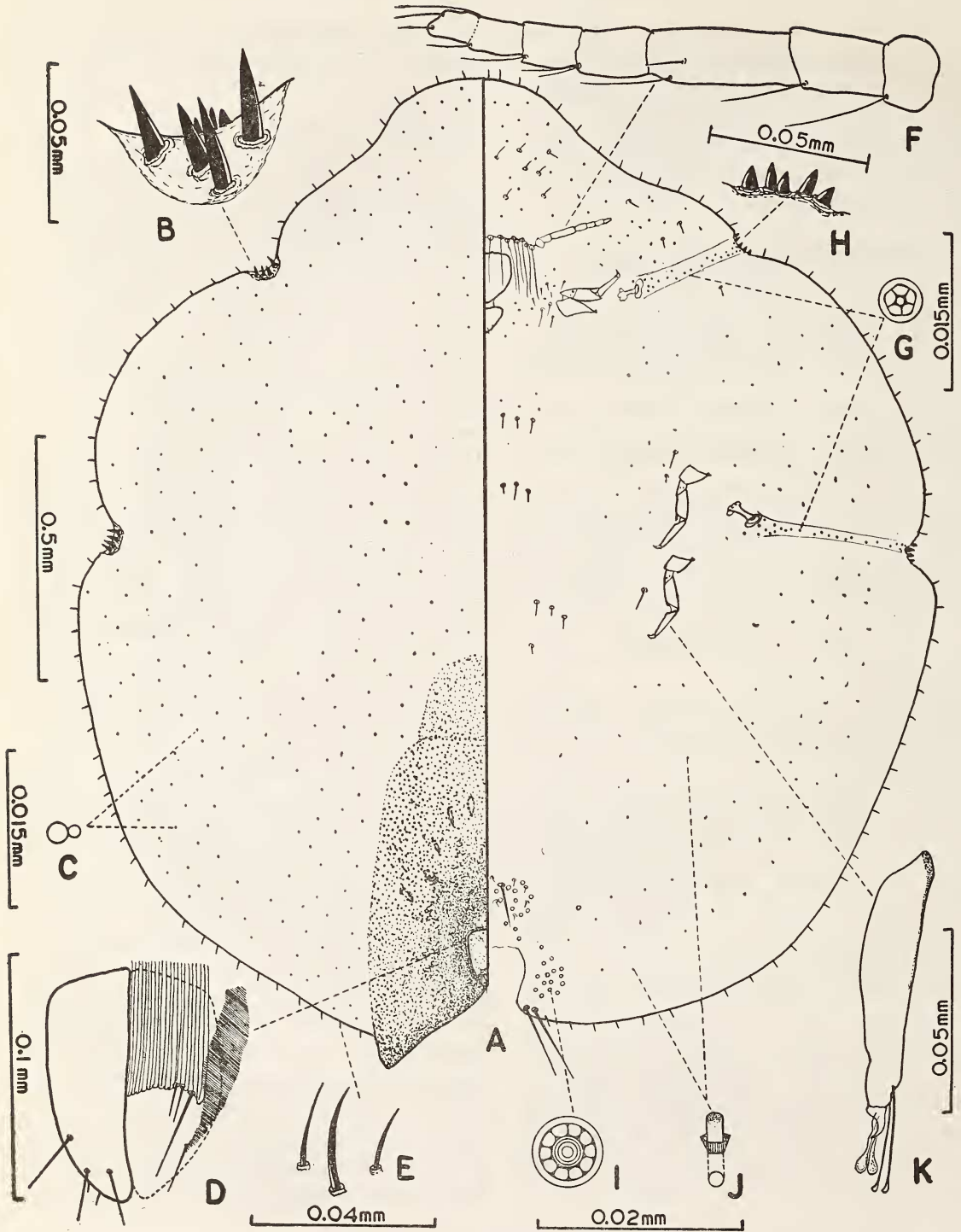


Fig. 4. A-K. *Vinsonia stellifera* (Westwood), ♀.

segment 3rd longest, slightly less than 3 times as long as wide. Legs small, tibia and tarsus fused together (fig. K); claws simple, digitules longer than claw and clubbed at apices; tarsal digitules slender, knobbed at apices; dimensions of fore, mid and hind legs: trochanter + femur (0.08 : 0.08 : 0.08 mm) and tibia + tarsus (0.06:0.06: 0.06 mm) respectively.

*Material examined*: 3 ♀, INDIA: Kerala, Kottayam, on *Syzygium cuminii*, 2. iv. 1979 (R. K. Avasthi).

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